

**New Species of *Apochthonius* from Western  
North America**

(Arachnida : Chelonethida)

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Specimens of *Apochthonius* Chamberlin are collected infrequently from litter, which suggests that their habitats are more restricted than, for example, those of *Chthonius californicus* Chamberlin. Numerous specimens of *Chthonius* Koch have been interpreted as belonging to a single variable species having an extensive distribution along the Pacific Coast. Populations of *Apochthonius*, however, appear to occupy distinct areas, with only *A. intermedius* Chamberlin (1929) being somewhat widespread.

Of the three *Apochthonius* recognized as new species, one is from the rain forest of the Olympic Peninsula of Washington, the second is from the coastal mountains north of San Francisco, and the third is from a limited area in the drainages of Putah and Cache creeks.

All specimens examined were cleared, lightly stained with lignin pink or chlorazol black, and mounted in a synthetic resin medium. Type specimens are deposited in the Department of Entomology, University of California, Davis.

***Apochthonius minimus* Schuster, new species**

(Figs. 1, 2, 5, 7)

MALE.—Total length, excluding chelicerae, 1.10 mm. Carapace 370  $\mu$  long, 410  $\mu$  wide; reticulate laterally; epistome of four small teeth; chaetotaxy 10:4:24; with setae of anterior margin (Fig. 2) longest near epistome (60  $\mu$ ), shortest at anterolateral angle (30  $\mu$ ). Tergal chaetotaxy 4:4:7:7:9:9:9: . . . ; setae of anterior tergites uniformly 75–80  $\mu$ , those of posterior tergites alternately 70  $\mu$  and 110  $\mu$ . Anterior genital operculum with six pairs of setae; posterior operculum with 14 setae along border, six lateral guard setae each side of genital opening (Fig. 7, guard setae solid); sternites IV–VII with about 14 setae. Chelicerae (Fig. 5) 335  $\mu$  long; both fixed and movable members with eight to nine teeth increasing in size toward apex. Palpal trochanter 168  $\mu$  long, 120  $\mu$  wide; femur 370  $\mu$  long, 92  $\mu$  wide; tibia 188  $\mu$  long, 100  $\mu$  wide; chela (Fig. 1) 565  $\mu$  long, 124  $\mu$  deep, movable member 383  $\mu$  long; distance between *t* and *st* 30  $\mu$ , *st* and *sb* 67  $\mu$ , *sb* and *b* 84  $\mu$ ; teeth near base of fixed member somewhat triangular, parallel-sided near apex, occasionally one or two large teeth separated by two or more normal teeth (detail, Fig. 1).

FEMALE.—Larger, carapace 400  $\mu$  long, 500  $\mu$  wide; palpal femur 400  $\mu$  long, 100  $\mu$  wide; anterior genital operculum with four pairs of setae.

*Holotype male*, one male and one female paratypes, 2 MILES NORTH OF BRINNON, OLYMPIC PENINSULA, WASHINGTON, 7 July 1959, in screening of mixed litter of maple, cedar, fir, rhododendron, and fern, L. M. Smith. One paratype female 1 mile east of Lake Cushman Dam, Olympic Peninsula, Washington, 7 June 1959, L. M. Smith.

The very small body size, and the presence of 10 short setae on the anterior margin of the carapace, distinguish this species from all others in the genus.

***Apochthonius irwini* Schuster, new species**

(Figs. 11, 12)

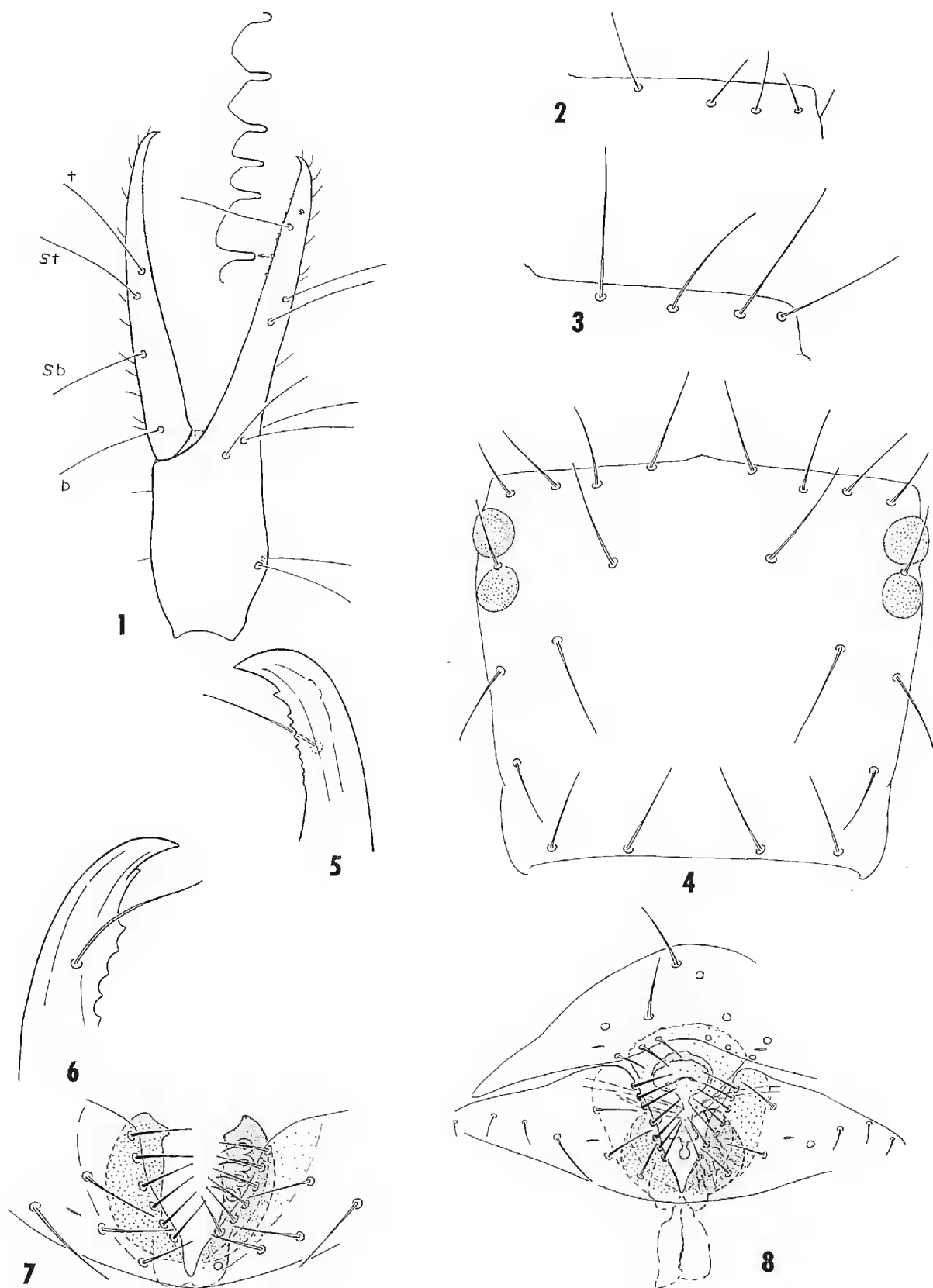
MALE.—Total length, excluding chelicerae, 1.33 mm. Carapace 370  $\mu$  long, 470  $\mu$  wide; reticulate laterally; epistome of three small teeth; chaetotaxy 8:4:22, with setae of anterior margin near epistome, about 75  $\mu$ , those at anterolateral angles 57  $\mu$ . Tergal chaetotaxy 4:4:8:8:10:10:...; setae of anterior tergites uniformly long (85–100  $\mu$ ); on posterior long setae (100–115  $\mu$ ) alternate with fairly short setae (65–70  $\mu$ ). Anterior genital operculum with six pairs of setae; posterior operculum with 14 setae along border, 13–15 lateral guard setae each side of genital opening arranged in two rows (Fig. 12, left side); sternites IV–VII with 12–14 setae. Chelicerae 355  $\mu$  long; both fixed and movable member with 8–10 teeth increasing in size towards apex. Palpal trochanter 168  $\mu$  long, 118  $\mu$  wide; femur 443  $\mu$  long, 80  $\mu$  wide; tibia 210  $\mu$  long, 114  $\mu$  wide; chela (Fig. 11) 645  $\mu$  long, 122  $\mu$  wide, 118  $\mu$  deep; movable member 444  $\mu$  long, with distance between *t* and *st* 38  $\mu$ , *st* and *sb* 92  $\mu$ , *sb* and *b* 92  $\mu$ ; teeth of fixed member parallel-sided except in basal third, with larger and smaller teeth irregularly spaced along entire length.

FEMALE.—Larger, carapace 470  $\mu$  long, 520  $\mu$  wide; palpal femur 505  $\mu$  long, 95  $\mu$  wide; anterior genital operculum with four pairs of setae.

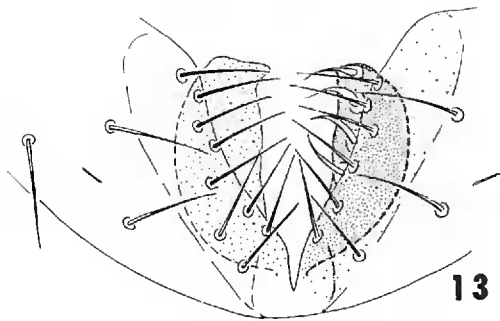
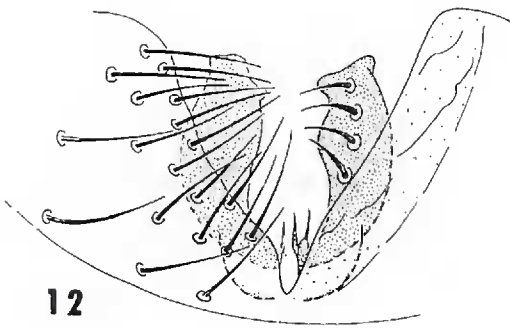
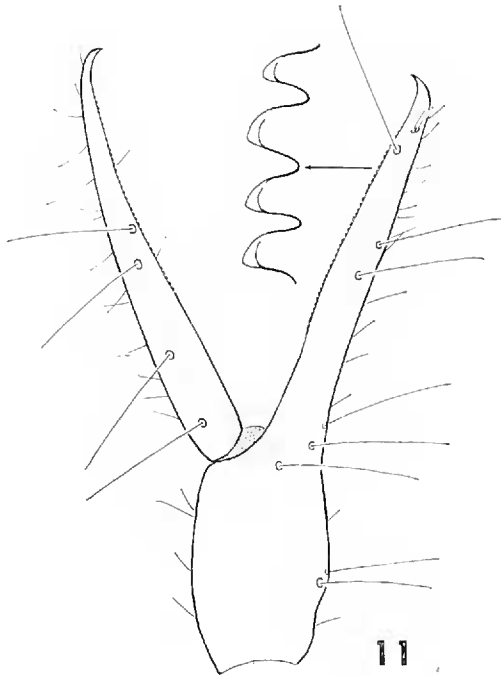
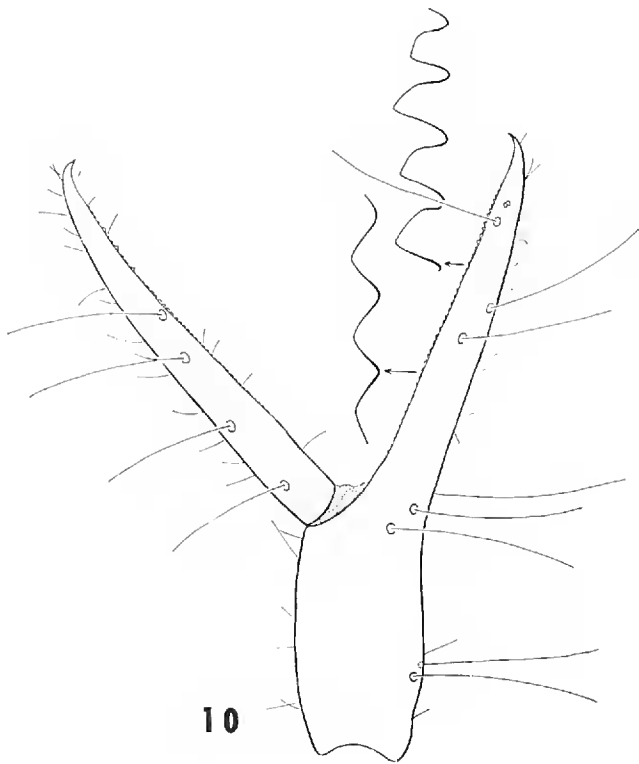
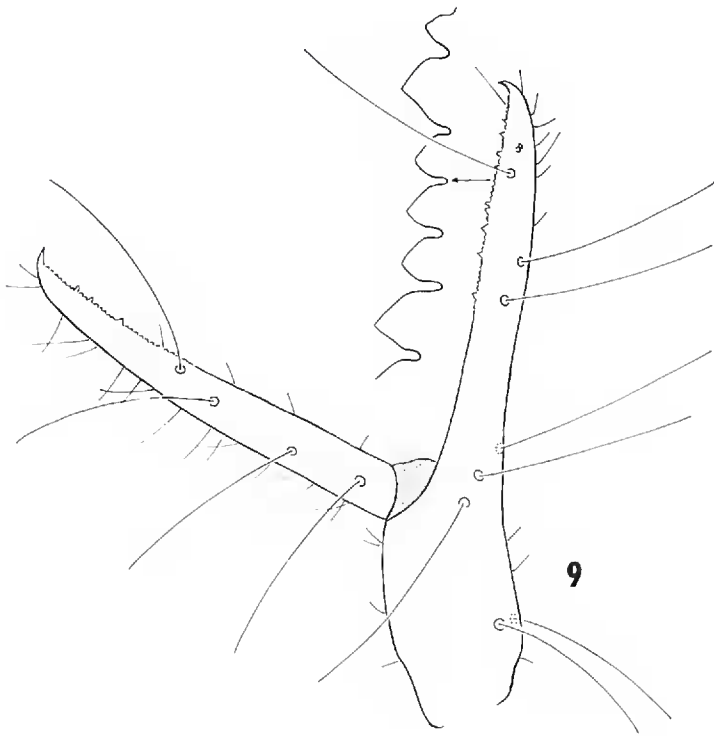
*Holotype male*, 5 MILES NORTHWEST OF SPANISH FLAT, NAPA COUNTY, CALIFORNIA, 1 March 1961, soil beneath grass, H. L. McKenzie; three paratype males 2.6 miles east of Jct. Hwys. 128 and 37, Napa Co., 1 March 1961, *Neotoma* nest, R. O. Schuster; Berryessa Park, Napa Co., 1 March 1961, R. O. Schuster; 3 miles south of Muskowite Corner, Napa Co., 7 February 1962, M. E. Irwin. One female paratype, Monticello Dam, Solano Co., Calif., 4 February 1962, M. E. Irwin.

This species is easily recognized by the large number of long, thin guard setae of the male genitalia. Presumably it has evolved in this one limited area, probably from the closely related, widespread, *A. intermedius*.

The spacing of the tactile setae on the movable member of the chela (Fig. 11) differs greatly from the spacing of the setae on the movable member of *A. minimus* (Fig. 1). However, examination of many specimens in this genus has shown that the larger the specimen, the larger the chela. Growth of the movable finger is primarily between setae *sb*



*Apochthonius minimus*, Fig. 1, chela; Fig. 2, right half of anterior margin of carapace; Fig. 5, movable member of chelicera; Fig. 7, male genital area, lateral guard setae solid. *Apochthonius intermedius*, paratype male, Fig. 4, carapace; Fig. 8, male genitalia including internal structures and anterior operculum, lateral guard setae solid; Fig. 9, chela. *Apochthonius maximus*, Fig. 6, movable member of chelicera; Fig. 10, chela; Fig. 13, male genital area, lateral guard setae solid. *Apochthonous irwini*, Fig. 11, chela; Fig. 12, male genital area, lateral guard setae solid.



and *st*, with the distance between *b* and *sb* and between *st* and *t* remaining relatively constant (compare Figs. 9, 10, and 11, all larger species with Fig. 1, the smallest species). The spacing of these setae, while indicative of body size, does not appear to be of value in species recognition.

This species is named for Mr. M. E. Irwin, who collected many pseudoscorpions while a student at Davis.

***Apochthonius maximus* Schuster, new species**

(Figs. 3, 10, 13)

MALE.—Total length, excluding chelicerae, 1.38 mm. Carapace 435  $\mu$  long, 505  $\mu$  wide; reticulate laterally, epistome comprised of a single tooth; chaetotaxy 8:4:22 (Fig. 3); setae of anterior margin 125  $\mu$  long near epistome, 105  $\mu$  at anterolateral angle. Tergal chaetotaxy 4:4:6:7:7:9:9: ...; setae of anterior tergites about 140  $\mu$  long, posterior tergites with long setae (about 185  $\mu$ ) alternating with short setae (95–100  $\mu$ ). Anterior genital operculum with six pairs of setae; posterior operculum with 14 setae along border, six to seven lateral guard setae in two ill-defined rows (Fig. 13, guard setae solid). Chelicerae 405  $\mu$  long; fixed member with 8–10 teeth increasing in size towards apex; movable member with five to six teeth. Palpal trochanter 195  $\mu$  long, 145  $\mu$  wide; femur 478  $\mu$  long, 100  $\mu$  wide; tibia 218  $\mu$  long, 128  $\mu$  wide; chela (Fig. 10) 685  $\mu$  long, 135  $\mu$  wide, 148  $\mu$  deep; movable member 464  $\mu$  long, with distance between *t* and *st* 44  $\mu$ , *st* and *sb* 114  $\mu$ , *sb* and *b* 81  $\mu$ ; teeth of both fixed and movable members nearly triangular, with some larger teeth on distal half.

FEMALE.—Carapace 490  $\mu$  long; palpal femur 528  $\mu$  long, 117  $\mu$  wide; anterior genital operculum with four pairs of setae.

*Holotype male*, three male and one female paratype, CASPAR LOOP ROAD, RUSSIAN GULCH STATE PARK, MENDOCINO COUNTY, CALIFORNIA, 22 December 1964, J. S. Buckett; three male and one female paratype, same locality, 24 October 1960, redwood litter, D. W. Price. Additional specimens considered to be conspecific, but not included in the type series, were collected from the following localities in California: Humboldt Co., Prairie Creek Redwood State Park; Lake Co., Lucerne; Marin Co., Carson Ridge, and near Inverness; Mendocino Co., Mendocino; Siskiyou Co., near Dunsmuir; Sonoma Co., near Mark West Resort.

*Apochthonius maximus* appears to be related to *A. magnanimus* Hoff (1956) from New Mexico because the chelal teeth are in part triangular. The latter species was said by Hoff (1956) to be similar to *A. moestus* except for the shapes of the teeth and hand of the chelae. The setae of the anterior margin of the carapace of *A. magnanimus* are therefore assumed to be short, as in *A. moestus*, and this character would separate *A. maximus* from *A. magnanimus*.



## KEY TO MALES OF APOCHTHONIUS

The characters used to separate *A. moestus* (Banks) in the following key are based on a series from Falls Church, Virginia, identified by J. C. Chamberlin. The placement of *A. magnanimus* is based on the assumption that it is similar to *A. moestus*. Dimensions of the segments of the palps are given for the holotypes of *A. occidentalis* Chamberlin and *A. intermedius* Chamberlin since the dimensions are not available in the literature.

- 1 Anterior margin of carapace with 10 (rarely nine or eight) setae (Fig. 2) 2  
Anterior margin of carapace with eight (rarely nine) setae (as in  
Figs. 3, 4) ..... 3
- 2(1) Femur of palp 530–580  $\mu$  long; widespread in North America ..... *moestus*  
Femur of palp 335–410  $\mu$ ; Washington state ..... *minimus*
- 3(1) Male genitalia with 10–15 long lateral guard setae arranged in  
two complete rows (Fig. 12) ..... *irwini*  
Male genitalia with 6–10 shorter lateral guard setae arranged in  
single row at least in anterior half (Figs. 7, 8, 13) ..... 4
- 4(3) All setae along anterior margin of carapace as long, or longer  
than width of, palpal femur (Fig. 3) ..... *maximus*  
At least anterolateral setae of carapace shorter than width  
of palpal femur (Fig. 4) ..... 5
- 5(4) Chelal teeth with basal margins parallel to basal margins of  
adjacent teeth; or ratio of length to width of palpal femur  
less than 4.75:1 (as Fig. 1) ..... 6<sup>1</sup>  
Chelal teeth triangular, the basal margins of adjacent teeth not  
parallel; femur of palp 4.75 times longer than wide ..... *magnanimus*
- 6(5) Palpal femur 460  $\mu$  long, 100  $\mu$  wide; tibia 225  $\mu$  long,  
124  $\mu$  wide; chela 715  $\mu$  long, 125  $\mu$  wide, 134  $\mu$  deep ..... *intermedius*  
Palpal femur 427  $\mu$  long, 97  $\mu$  wide; tibia 201  $\mu$  long, 118  $\mu$   
wide, chela 628  $\mu$  long, 124  $\mu$  wide ..... *occidentalis*

## LITERATURE CITED

- CHAMBERLIN, J. C. 1929. On some false scorpions of the suborder heterosphyronida (Arachnida—Chelonethida). Canadian Entomol., 61: 152–155.  
HOFF, C. C. 1956. The heterosphyronid pseudoscorpions of New Mexico. American Museum Novitates, no. 1772: 1–13.

<sup>1</sup> The shape of the teeth of *A. occidentalis* is not known because the type has neither chela positioned laterally. I suspect that *A. occidentalis* lies within the size range expected for *A. intermedius*. However, most of the characters that should be considered for purposes of identifying species are obscure or absent on the type specimen.